



UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office

Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

RD

AK

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
-----------------	-------------	----------------------	---------------------

09/222,524 12/28/98 MATSUDA

S NEC-N98039

┌

MMC2/0123

EXAMINER

NORMAN P SOLOWAY
HAYES SOLOWAY HENNESSEY GROSSMAN &
HAGE
175 CANAL STREET
MANCHESTER NH 03101

PAREKH, N	
ART UNIT	PAPER NUMBER

2811
DATE MAILED:

01/23/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
09/222,524

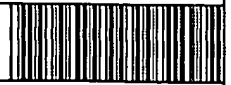
Applicant(s)

Shulchi

Examiner

Nitin Parekh

Group Art Unit
2811



☒ Responsive to communication(s) filed on Nov 17, 2000

☒ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 35 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claim

☒ Claim(s) 1-20 is/are pending in the application

Of the above, claim(s) _____ is/are withdrawn from consideration

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-20 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☒ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☒ received.

☐ received in Application No. (Series Code/Serial Number) _____

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

Art Unit: 2811

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Rostoker (US Pat. 5399898), Kata et al (US Pat. 5905303) and Liang (US Pat. 5952726).

Regarding claims 1 and 11, the admitted prior art discloses a semiconductor device comprising:

- a wiring substrate/tap automated bonding (TAB) substrate/film carrier having a predetermined pattern of wiring formed on one surface and having a number of through-holes
- a semiconductor chip disposed on the other surface of the wiring substrate having chip electrodes and a wiring layer
- a number of bumps formed respectively in through-holes in conforming relationship with the chip electrodes and electrically connecting the wiring with the electrode, and
- an external bump pad electrically connected through the wiring layer to the chip electrode.

The admitted prior art fails to specify the semiconductor chip having two or more chip electrodes in a common wiring layer. Rostoker teaches using a semiconductor device with a variety of

Art Unit: 2811

internal connections where two electrodes (222 c and d in Fig. 2b) are connected to a common wiring layer (Fig. 2b; Col. 11, line 23-Col. 12, line 13) in a flip-chip assembly. Therefore, it would have been obvious to the person of ordinary skill in the art to provide two or more chip electrodes in a common wiring layer in the semiconductor chip and eclectically connecting to the external bump pad to increase the internal connection capability using Rostoker's teaching in the admitted prior art as cited in claims 1 and 11.

Regarding claims 2 and 12, the admitted prior art fails to show an arrangement of the chip electrodes. Kata et al teach using a variety of layouts for the chip electrodes where the chip electrodes are arranged from the edge of the chip towards it's inner side (Fig. 5B, 13B and 17B; Col. 4, line 46, Col. 7, line 30 and Col. 8, line 66). Therefore, it would have been obvious to the person of ordinary skill in the art to select an arrangement of the chip electrodes where they are arranged from an edge of the chip towards it's inner side to meet the design requirement using Kata et al's teaching in the admitted prior art as cited in claims 2 and 12.

Regarding claims 3 and 13, the admitted prior art fails to show an arrangement of the chip electrodes being parallel to an edge of the chip and the wiring being bent at least one position. Kata et al teach using a variety of layouts for the chip electrodes and the wiring where the chip electrodes are arranged parallel to an edge of the chip and the wiring is bent at various positions (Fig. 5B, 13B and 17B; Col. 3-10). The cited reference by Liang teaches using power/signal

Art Unit: 2811

wiring layout with patterns of different dimensions, shapes where the wiring is bent at various positions (Fig. 4A; Col. 7, line 10) to meet the chip design ground rules (Fig. 1-4, Col. 3-9).

Therefore, it would have been obvious to the person of ordinary skill in the art to select an arrangement of the chip electrodes where they are arranged parallel to an edge of the chip and the wiring is bent at least one position to meet the design requirement using Kata et al's teaching in the admitted prior art as cited in claims 3 and 13.

Regarding claims 4 and 14, the admitted prior art fails to specify the chip electrodes being parallel to an edge of the chip and the wiring having an end width larger than an interelectrode distance between the chip electrodes. As explained above for claims 1 and 3, Kata et al and Liang teach using a variety of arrangements and shapes/dimensions of electrode layout and wiring patterns to meet the chip design ground rules. Therefore, it would have been obvious to the person of ordinary skill in the art to select an arrangement of the chip electrodes where they are arranged parallel to an edge of the chip and the wiring dimension which has an end width larger than an interelectrode distance between the chip electrodes to meet the design requirement using Kata et al's and Liang's teachings in the admitted prior art as cited in claims 4 and 14.

Regarding claims 5 and 15, the admitted prior art fails to specify the chip electrodes comprising at least one kind of terminal selected from ground, power-source and signal terminals of the semiconductor chip. Liang teaches using the chip electrodes comprising ground, power-source

Art Unit: 2811

and signal terminals of the semiconductor chip in a flip-chip assembly (Fig. 4A-C; Col. 2-9; Fig. 1-7). Therefore, it would have been obvious to the person of ordinary skill in the art to incorporate the chip electrodes comprising at least one kind of terminal selected from ground, power-source and signal terminals of the semiconductor chip to meet the electrical/design requirements using Liang's design in the admitted prior art as cited in claims 5 and 15.

Claims 6 and 16 are rejected as explained above for claims 1 and 11 respectively.

Claims 7 and 17 are rejected as explained above for claims 2, 1 and 12, 11 respectively.

Claims 8 and 18 are rejected as explained above for claims 3, 1 and 13, 11 respectively.

Claims 9 and 19 are rejected as explained above for claims 4, 1 and 14, 11 respectively.

Claims 10 and 20 are rejected as explained above for claims 5, 1 and 15, 11 respectively.

Response to Arguments

2. Applicant's arguments filed on 11-17-00 have been fully considered but they are not persuasive.

Art Unit: 2811

A. Applicant contends that none of the art citations teaches two or more chip electrodes on a common wiring layer and connecting an external bump pad to two or more electrodes through a common wiring layer. However, the admitted prior art (APA) clearly discloses an external bump pad electrically connected through the wiring layer to the chip electrode (Fig. 7 and 8; specification page 1 and 2). Rostoker teaches using a flip-chip device/substrate connections having a semiconductor chip with a variety of internal connections where two electrodes (222 c and d in Fig. 2b) are connected to a common wiring layer (Fig. 2b; Col. 11, line 23-Col. 12, line 13). Therefore, the teaching of Rostoker's chip design is applied to APA to achieve the electrical connection of two or more chip electrodes and the external bump pad through the common wiring layer as recited in independent claims 1, 6, 11, 16 and other claims dependent thereon.

3. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

Art Unit: 2811

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Papers related to this application may be submitted directly to Art Unit 2811 by facsimile transmission. Papers should be faxed to Art Unit via Technology Center 2800 fax center located in Crystal Plaza 4, room 4C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (15 November 1989).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nitin Parekh whose telephone number is (703) 305-3410. The examiner can be normally reached on Monday-Friday from 08:30 am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas, can be reached on (703) 308-2772. The fax number for the organization where this application or proceeding is assigned is (703) 308-7722 or 7724.

Nitin Parekh

01-17-01

Tom Thomas
Supervisor
Art Unit 2811